WHAT IS CLAIMED IS

SUB A7

1. A semiconductor photodetection detector, comprising:

a semiconductor substrate of a first conductivity type;

a photodetection layer formed on said semiconductor substrate;

a region of a second conductivity type opposite to said first conductivity type being formed in a part of said photodetection layer; and

an electrode applying an electric field to said photodetection layer via said region of said second conductivity type such that said electric field acts in a thickness direction of said photodetection layer,

said photodetection layer comprising: a first semiconductor layer having a first thickness and accumulating therein a compressive strain and absorbing an optical radiation; and a second semiconductor layer having a second thickness smaller than said first thickness and accumulating therein a tensile strain, said first semiconductor layer and said second semiconductor layer being stacked alternately and repeatedly in said photodetection layer.

2. A semiconductor photodetection device as claimed in claim 1, wherein said first semiconductor layer accumulates therein a strain of 0.2% or more but not exceeding 0.6%.

Sub B1

3. A semiconductor photodetection device as claimed in claim 1, wherein said first semiconductor layer has a thickness of 50 nm or more.

SUB A8

4. A semiconductor device as claimed in claim 1, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \varepsilon)$ in terms of microns, wherein ε represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

Sub B1

5. A semiconductor photodetection device as claimed in claim 3, wherein the second thickness of the second semiconductor layer is smaller than one-half the first thickness of the first semiconductor layer.

SUB A9

6. A semiconductor device as claimed in claim 5, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \varepsilon)$ in terms of microns, wherein ε represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said

SUB A9 CONT.

first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

sub B3

7. A semiconductor photodetection device as claimed in claim 1, wherein each of said first and second semiconductor layers comprises a ternary compound semiconductor material.

SUB A10

8. A semiconductor device as claimed in claim 7, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \varepsilon)$ in terms of microns, wherein ε represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

sub B3

9. A semiconductor photodetection device as claimed in claim 1, wherein said substrate comprises n-type InP and said first and second semiconductor layers comprise n-type InGaAs.

SUB A11

10. A semiconductor device as claimed in claim 9, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of ($0.9 \times L^{1/4} \times \varepsilon$) in terms of microns, wherein ε represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

NEW B

11. A semiconductor photodetection device as claimed in claim 1, further comprising an intermediate layer between said first and second semiconductor layers, said intermediate layer having an intermediate bandgap between a bandgap of said first semiconductor layer and a bandgap of said second semiconductor layer.

SUB A12

12. A semiconductor device as claimed in claim 11, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of ($0.9 \times L^{1/4} \times \varepsilon$) in terms of microns, wherein ε represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

Sub B1

13. A semiconductor photodetection device as claimed in claim 11, wherein said intermediate layer is provided at a side of said first semiconductor layer closer to said region of said second conductivity type.

14. A semiconductor photodetection device as claimed in claim 11, wherein said intermediate layer has a composition profile that changes gradually in a thickness direction thereof.

15. A semiconductor photodetection device as claimed in claim 14, wherein said intermediate layer accumulates a tensile strain at a side thereof contacting said second semiconductor layer and a compressive strain at a side thereof contacting said first semiconductor layer.

16. A fabrication process of a semiconductor photodetection device, comprising the steps of:

forming a photodetection layer on a semiconductor substrate by alternately and repeatedly forming a first semiconductor layer and a second semiconductor layer on said semiconductor substrate while changing a flow-rate of source gases without interrupting a supply thereof; and

forming an electrode on said photodetection layer so as to apply an electric field in a thickness

direction of said photodetection layer,

said first semiconductor layer being formed of a ternary compound semiconductor material having a lattice constant different from a lattice constant of said substrate and accumulating therein a compressive strain, said second semiconductor layer being formed of a ternary compound semiconductor material having a lattice constant different from said lattice constant of said substrate and accumulating therein a tensile strain.

17. A method as claimed in claim 16, wherein said steps of forming said first semiconductor layer and said second semiconductor layer being conducted alternately by an MOVPE process while changing a flow-rate of metal organic sources continuously.